BULLETIN OF THE
U.S. DEPARTMENT OF AGRICULTURE

No. 192

Contribution from the Bureau of Entomology, L. O. Howard, Chief.
April 8, 1915.

(PROFESSIONAL PAPER.)

IMP. DEPT. AGR.
30 APR. 1915
ENTOM.

INSECTS AFFECTING VEGETABLE CROPS IN PORTO RICO.[1]

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INTRODUCTION.

The following article can not be considered to include references to all the many insects which attack vegetable crops in Porto Rico. Undoubtedly there are many other insect species which are pests on plants, commonly classed as vegetables, that are grown on the island. Nevertheless it seems well to present the data available—data which have been obtained from references already published and from observations made by the writer since November, 1911, while a member of the staff of the experiment station of the Porto Rico Sugar Producers' Association. Especially does it seem timely to publish this paper because of the effort being made by the United States Department of Agriculture to obtain information upon the obnoxious insects liable to introduction into the United States, and because of the steps that are being taken to prevent them from being introduced. While it will be noted that many of the species mentioned in the following pages already occur in the United States, several are not known to be present on the mainland.

The determinations of the insects mentioned as having been observed by the writer have been made, with few exceptions, by specialists of the Bureau of Entomology, United States Department of Agriculture. The names of several of the wild host plants and of the fungi have been supplied by Mr. J. R. Johnston, pathologist of the experiment station of the Porto Rico Sugar Producers' Association.

It may be said in general that vegetables suffer severe injury in Porto Rico from insects. The vegetables grown are, for the most part, the same as those of the markets of the United States, although

[1] The observations on which this paper was founded were conducted by the author while a collaborator in Porto Rico.

NOTE.—This bulletin enumerates the more common insects attacking vegetable crops in Porto Rico; of interest to entomologists.

there are some with which the visitor from the North is not familiar. Among these may be mentioned a cucurbit, the "chayote" (*Sechium edule*); the "lleren" (*Calathea allouya*), a canna-like plant with edible tubers; and the various members of the genera Xanthosoma Colocasia, known as "yautias," the latter known also as the "dasheen" in the southern United States.

The following figures, taken from the Summary of Transactions in the United States Customs District of Porto Rico, show the value of the vegetables brought into Porto Rico during the fiscal year ended June 30, 1912:

Vegetables, dried, canned, and pickled, imported by Porto Rico during fiscal year ended June 30, 1912.

Commodity.	Domestic merchandise from United States.		Merchandise imported from foreign countries.	
	Quantity.	Value.	Quantity.	Value.
	Bushels.		*Bushels.*	
Beans and dried peas	179,131	$543,577	7,315	$21,020
Onions	16,446	25,624	42,574	33,224
Potatoes	141,797	164,410	51,960	48,682
All others (canned)	.....	43,083	.....	12,571
All others (including pickles and sauces)	.....	15,427	.....	82,703
Total value	.....	792,121	.....	198,200

These figures indicate that the cultivation of vegetables could well be extended by those who have sufficient land at their disposal, and further study of the various vegetable insects, especially as regards control measures, would be of great importance in encouraging such cultivation.

THYSANOPTERA AND HEMIPTERA, OR SUCKING INSECTS.

Thrips tabaci Lind.

This well-known species, the onion thrips, has been found attacking onions.

Peregrinus maidis Ashm.

Where it occurs in abundance down among the unrolling leaves of corn, as it often does in Porto Rico, this "leafhopper" injures the leaves so that they have the appearance of having been scorched by fire. The presence of the "honeydew" which they secrete is responsible for the attendance of various ants and flies.

Jassidæ.

"*Agallia tenella* Ball," presumably *Eutettix tenella* Baker, was mentioned by Mr. Barrett in 1904 [1] as having "injured beans and other small crops," and in the same year this species was mentioned on

[1] Barrett, O. W. Report of . . . entomologist and botanist. In Porto Rico Agr. Expt. Sta. Ann. Rpt. for 1903 [U. S. D. A. Office Expt. Stas. Rpt. 1903], p. 448, 1904.

page 84 of Bulletin No. 44 of the Division of Entomology, United States Department of Agriculture, as having been sent from Porto Rico by Mr. Barrett, with the statement that it damaged the leaves of beans, cowpeas, and other plants.

Mr. Barrett also mentioned *Empoasca mali* LeB., the currant leafhopper, in his 1903 report, above referred to (p. 448), as the "severest insect enemy of beans and cowpeas."

The writer has found *Empoasca mali* causing acute injury to garden beans, the leaves being badly curled and distorted.

Aphididæ.

Though several species of aphides, or plant lice, attack vegetables, the well-known "melon aphis," *Aphis gossypii* Glov., is apparently the only one specifically recorded from the island. Mr. Barrett mentioned it in 1905,[1] and in 1906 Mr. Henricksen,[2] in discussing the cultivation of watermelons, stated that it "often infests the undersides of the leaves."

Aphis gossypii has been observed in abundance on cucumber, while other aphides have been found attacking corn, okra, and mustard. In his report for 1903 (p. 447) Mr. Barrett also stated that "a black aphid was found on a plant purchased as *Alocasia marshallii*, but believed to be a Xanthosoma" (yautia), and that "the malanga (*Colocasia antiquorum esculentum*) is occasionally attacked by an aphid which is usually parasitized by a whitish fungus and a hymenopter."

In the article in Bulletin No. 44 of the Division of Entomology the statement is made, on page 84, that, according to Mr. Barrett, an unknown species of Aphis seriously affects squashes.

Mr. Henricksen has mentioned, in the previously cited bulletin on vegetable growing (p. 38), an "eggplant aphis, a small light gray, mealy looking insect," which "appears on the underside of the leaves."

Aphis gossypii and other aphides found on okra are attacked by an internal parasite, perhaps *Aphidius testaceipes* Cress. A fungus, *Acrostalagmus albus* Preuss, attacks various species, and at least five species of ladybird beetles which feed upon aphides are present in Porto Rico. These are: *Cycloneda sanguinea* L., *Megilla innotata* Vauls., *Scymnus roseicollis* Muls., *Scymnus loewii* Muls., and *Hyperaspis apicalis* Muls. Syrphid flies are also common.

Aleyrodes sp.

Mr. Tower[3] in 1908 stated that "a white fly (*Aleyrodes* sp.) appeared in great numbers on the peppers and tomatoes" at the experiment station at Mayaguez, P. R. He further mentions that "there

[1] Barrett, O. W. Report of . . . entomologist and botanist. In Porto Rico Agr. Expt. Sta. for 1904 [U. S. D. A. Office Expt. Stas. Rpt. 1904], p. 396, 1905.

[2] Henricksen, H. C. Vegetable growing in Porto Rico. Porto Rico Agr. Expt. Sta. Bul. 7, p. 58, 1906.

[3] Tower, W. V. Report of the Entomologist and Plant Pathologist. Porto Rico Agr. Expt. Sta. Ann. Rpt. for 1907, p. 36.

appears to be a great number of parasites." Two species of syrphid flies were reared and a parasitic fungus was observed.

COCCIDÆ.

The following scale insects have been taken on truck crops: *Saissetia hemisphærica* Targ. (Pl. I, fig. 1) and *Hemichionaspis minor* Mask. on eggplant, and *Diaspis pentagona* Targ. on okra and pepper.

A mealybug has been found at the roots of celery and corn which has been determined as *Pseudococcus* sp. near *citri* Risso. It was abundant on the crowns of plants growing in rather dry soil, and was in many cases attended by the "fire ant," *Solenopsis geminata* Fab.

SPARTOCERA BATATAS Fab.

Adults (Pl. I, fig. 2) and nymphs of *Spartocera batatas* have been observed in great abundance on sweet potato, their beaks embedded in the stalks and leaf petioles of the plants.

CORYTHUCA GOSSYPII Fab.

The tingitid *Corythuca gossypii*, which breeds on the undersides of yautia leaves, also occurs in the same situation on the sword bean (*Canavalia ensiformis*) and the castor bean (*Ricinus communis*).

PHTHIA PICTA Drury.

This coreid bug (Pl. I, fig. 3) attacks tomato and *Solanum nigrum* var. *americanum* at Rio Piedras, and both adults and nymphs have been observed by the writer inserting their beaks into the fruit of both host plants.

CORYTHAICA MONACHA Stål.

Nymphs and adults of *Corythaica monacha* have been observed to be so abundant on the undersides of the leaves of eggplant that all the foliage withered, turned brown, and fell from the plant. Although this was an unusual instance, this tingitid is an important enemy of the eggplant. Plants of a common solanaceous weed, *Solanum torvum*, are also often attacked.

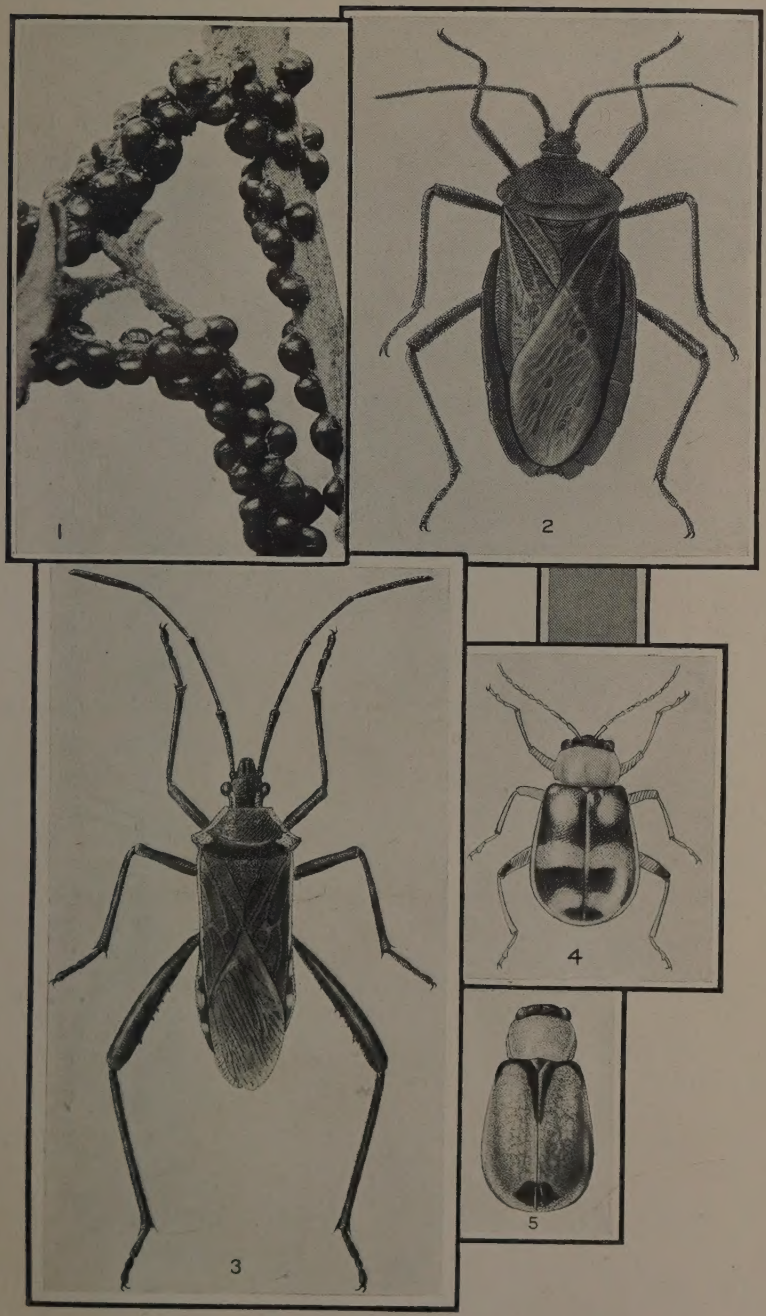
ORTHOPTERA.

SCAPTERISCUS DIDACTYLUS Latr.

Probably the most notorious of Porto Rico insects is the "mole cricket," or "changa" (*Scapteriscus didactylus*), which injures many vegetables by cutting off the plants at or just below the surface of the soil.

In the most complete article on this species so far published in English[1] it is stated that "among the small crops the tomato, egg-

[1] Barrett, O. W. The changa or mole cricket (*Scapteriscus didactylus* Latr.) in Porto Rico. Porto Rico Agr. Exp. Sta. Bul. 2, 19 p., 1 fig., 1902.



INSECT ENEMIES OF VEGETABLE CROPS IN PORTO RICO.

FIG. 1.—The hemispherical scale (*Saissetia hemisphærica*) on eggplant. FIG. 2.—*Spartocera batatas:* Adult. Greatly enlarged. FIG. 3.—*Phthia picta:* Adult male. Much enlarged. FIG. 4.—*Cerotoma denticornis:* Beetle. Enlarged. FIG. 5.—*Cerotoma denticornis:* Pale variety. Enlarged. (Original.)

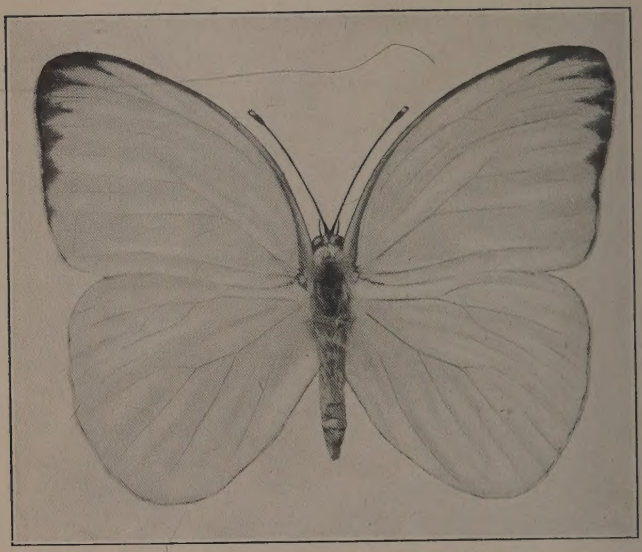


FIG. 1.—PIERIS MONUSTE: MALE BUTTERFLY. MUCH ENLARGED. (ORIGINAL.)

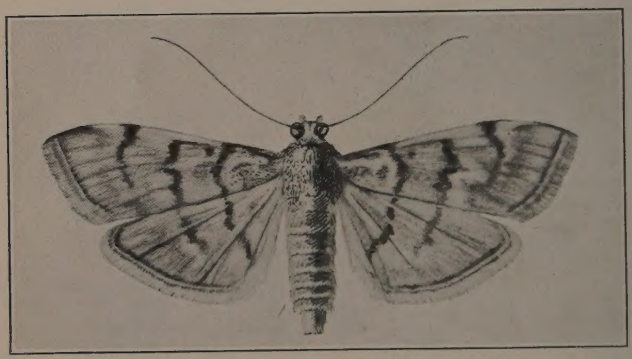


FIG. 2.—NACOLEIA INDICATA: MALE MOTH. ENLARGED. (ORIGINAL.)

LEPIDOPTERA INJURIOUS TO VEGETABLES IN PORTO RICO.

plant, turnip, and cabbage are most affected," and that the watermelon, bean, sweet potato, and yautia are seldom or never attacked.

COLEOPTERA.

Diabrotica bivittata Fab. and D. innuba Fab.

These two chrysomelid beetles occur in abundance on cucumber, squash, and melon, especially on the flowers. They quite closely resemble *Diabrotica vittata* Fab. in appearance and habits, and those authors who have referred to *vittata* as being present on the island have apparently failed to differentiate between the species.

Diabrotica graminea Bal.

This chrysomelid beetle is very common in Porto Rico. Mr. Van Dine has reported the adults as feeding on the leaves of sugar cane to a slight extent.[1]

The beetles are bluish-green in color and about one-fourth of an inch in length. So far as the writer has observed, the injury is most severe on corn and okra, which are, in fact, the only two plants of this group upon which the writer is certain that they feed, although they have been observed feeding on the flowers of cowpeas, the fruit of *Solanum nigrum* var. *americanum*, and the foliage of "jobo" (*Spondias lutea*) and "bledo" (*Amaranthus spinosus*).

The injury to corn is apparently confined to the silk of the ear and the blossom spike. On these parts of the plant the beetles congregate in great numbers, and the results of their feeding are very apparent, especially on that portion of the silk which, ordinarily projecting from the tip of the husk, is completely destroyed. On okra they feed upon the blossoms and the young leaves.

An assassin bug, *Zelus rubidus* Stål., has been taken with a beetle of this species impaled upon its beak.

Cerotoma denticornis Oliv.

In appearance this beetle resembles the bean leaf-bettle (*Cerotoma trifurcata* Forst.), which also occurs in the United States, and, as is the case with the latter species, there is a marked difference in the markings on the wing-covers. This difference is shown in figures 4 and 5 of Plate I.

Adults of *Cerotoma denticornis* have been found feeding upon garden beans and cowpeas, plants which have been reported on the mainland as food plants of *trifurcata*. The habits of the two species are quite similar. Mr. Barrett, in his 1903 report (p. 448), mentioned *denticornis* as being common.

[1] Van Dine, D. L. Report of the Entomologist. Sugar Producers' Association of Porto Rico. Ann. Rpt. 3, p. 34, 1913.

EPITRIX CUCUMERIS Harr.

Flea-beetles have been taken on eggplant and tomato, which agree with those taken in company with *Epitrix parvula* Melsh. on a weed (*Physalis* sp.). Those taken on the latter plant were said by Mr. E. A. Schwarz to be "properly not different from the U. S. cucumber flea-beetle, *Epitrix cucumeris*." On the eggplant the beetles were causing the familiar "flea-beetle injury" to the leaves.

CHÆTOCNEMA APRICARIA Suffr.

This insect injures sweet potato leaves in much the same manner as does *Chætocnema confinis* Lec. in the United States, searing them with short, continuous, curved lines. The beetle is of a dark metallic-green color and has been observed in abundance at certain seasons on a common weed, related to the sweet potato.

COPTOCYCLA SIGNIFERA Herbst.

An adult of this "tortoise beetle" has been taken on the leaves of sweet potato. In the United States the species is known as an enemy of this crop.

CRYPTORHYNCHUS BATATÆ Waterh.

The writer is able to record this enemy of the sweet potato through the kindness of Mr. R. H. Van Zwaluwenburg, Entomologist of the Porto Rico Agricultural Experiment Station. Mr. Van Zwaluwenburg has found it attacking sweet potato tubers at Mayaguez. The species has been mentioned as an enemy of the sweet potato in the Lesser Antilles, where it seems to be a more important pest than *Cylas formicarius*.

CYCLAS FORMICARIUS Oliv.

The "sweet-potato root-borer" is present in Porto Rico, it having been observed working in the tuberous root of a wild convolvulaceous plant.

LEPIDOPTERA.

PIERIS MONUSTE L.

The "southern cabbage worm" was mentioned by Mr. Tower in his 1907 report (pp. 35 and 36) as feeding on cabbage, radish, turnip, kale, and mustard. The male butterfly is shown in Plate II, figure 1.

The larvæ have also been found feeding on horseradish and an uncultivated plant, *Cleome spinosa*, of the family Capparidaceæ. This weed is evidently an important wild food plant of *P. monuste* in Porto Rico and is commonly found, especially on the lower lands, near the rivers. Prof. Ignatius Urban gives it the local Spanish common name of "jasmin del rio" in his Flora Portoricensis.

EUDAMUS PROTEUS L.

This hesperid, the so-called "bean leaf-roller," feeds upon garden beans, cowpeas, and a related weed, *Phaseolus lathyroides*.

Eggs that probably belonged to this species, found on the leaves of the last-mentioned plant, were parasitized by *Trichogramma minutum* Riley.

PHLEGETHONTIUS SEXTA Joh.

Mr. Barrett reported this species, under the name of *Protoparce carolina*, in his 1903 report (p. 448) as occurring commonly on tomato and tobacco throughout the island, and made the interesting note that the larvæ were usually killed by a thrust of a knife made from a "maya" (*Bromelia pinguin*) leaf. The larva also feeds upon the common "berengena cimarrona" (*Solanum torvum*), and Mr. Tower has stated in his 1907 report (p. 36) that the parasite *Telenomus monilicornis* held in check the "tobacco hornworm" (probably this species), eggs of which were found on tomato and pepper.

PHLEGETHONTIUS CONVOLVULI L.

Adults of this species, which is known elsewhere as a sweet potato pest, have been collected at Rio Piedras, P. R.

LAPHYGMA FRUGIPERDA S. & A.

Although corn and onions are the only vegetables so far observed to be attacked by the larvæ of *Laphygma frugiperda*, or "grass worm," the list of such plants upon which they feed is undoubtedly much larger.

In addition to the enemies previously recorded by the writer,[1] namely, the three tachinid flies, *Frontina archippivora* Will., *Gonia crassicornis* Fab., and *Archytas piliventris* V. d W., the larvæ are attacked by two fungi, *Botrytis rileyi* Farlon and *Empusa* sp., and by an assassin bug, *Zelus rubidus* Stål. An interesting parasite, *Chelonus insularis* Cress. (?), the egg of which is laid in the Laphygma egg, the parasite issuing from and killing the host larva when the latter is about one-half inch in length, has also been observed.

A carabid beetle, *Calosoma alternans* Fab., is predaceous upon the larvæ, and another carabid, *Cymindis marginalis* Dej., probably has the same habit.

HELIOTHIS OBSOLETA Fab.

The corn ear-worm attacks corn in Porto Rico and is to be considered an important pest to this crop. Mr. Barrett mentioned it in his 1903 report (pp. 443 and 444).

[1] Some notes on *Laphygma frugiperda* S. & A. in Porto Rico. Jour. Econ. Ent., v. 6, no. 2, p. 235, April, 1913.

Other Noctuidæ.

Three other noctuid moths, that have been reared from larvæ, belong to the species known to injure truck crops in the United States. *Xylomyges eridania* Cram., the larvæ of which occurred on *Amaranthus* sp., has been mentioned by Messrs. Chittenden and Russell under the name of *Prodenia eridania* Cram.[1] as attacking Irish potatoes, eggplant, pepper, okra, and sweet potato in Florida, and they give, on another's authority, beets, cabbage, and carrots as food plants.

Prodenia ornithogalli Guen., the cotton cutworm, reared from larvæ found feeding on a weed of the family Convolvulaceæ, is stated by Dr. Chittenden to be an enemy of several vegetable crops.[2]

The larvæ of *Feltia anneza* Treits., which species has been reared from larvæ found in an area where "grass worms" (*Laphygma frugiperda* S. & A. and *Remigia repanda* Fab.) were abundant, is known as a cutworm on the mainland.

Diaphania hyalinata L.

Cucumbers and squashes are frequently severely attacked by the larvæ of this species, the melon caterpillar. Mr. Barrett mentioned the species in his 1903 report (p. 448).

Pachyzancla bipunctalis Fab.

The "southern beet webworm" has been found feeding on garden beans, sword bean (*Canavalia ensiformis*), and weeds belonging to the genus Amaranthus. Upon the garden bean and Amaranthus it was feeding on the leaves, which it webs together, forming for itself a shelter, as is commonly done by pyralid larvæ. The leaf or leaves of which the shelter is formed are skeletonized and the pupæ are sometimes found in the shelters, but more often in earthen cells just below the soil surface. The larvæ found on sword bean were feeding within the green pods.

Exorista pyste Walk., a tachinid parasite of the larvæ, has been observed.

In connection with *Pachyzancla bipunctalis* it may be mentioned that another pyralid, *Hymenia* (*Zinckenia*) *fascialis* Cramer, occurs in Porto Rico. It has been observed under conditions that would indicate that the larvæ feed upon *Amaranthus* spp. Mr. H. O. Marsh has studied this species in the Hawaiian Islands, and in Bulletin 109, Part I, of the Bureau of Entomology, states that various beets and several species of Amaranthus are among the plants which suffer from its attack there.

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[1] Chittenden, F. H., and Russell, H. M. The semitropical army worm. (*Prodenia eridania* Cram.). U. S. D. A., Bur. Ent., Bul. 66, pt. 5, p. 53-70, figs. 8-11, Jan. 28, 1909.

[2] Chittenden, F. H. Some insects injurious to the violet, rose, and other ornamental plants. U. S. D. A., Div. Ent., new ser. Bul. 27, rev., p. 64, 68, 69, 70, 1901.

FIG. 1.—WORK OF THE LARVA OF PACHYZANCLA PERIUSALIS ON SOLANUM TORVUM. (ORIGINAL.)

FIG. 2.—PILOCROCIS TRIPUNCTATA: MOTH. ENLARGED. (ORIGINAL.)

LEPIDOPTERA INJURIOUS TO VEGETABLES IN PORTO RICO.

MUSTARD LEAF SHOWING INJURY BY THE DIAMOND-BACK MOTH (PLUTELLA MACULIPENNIS). (ORIGINAL.)

PACHYZANCLA PERIUSALIS Walk.

Larvæ of this pyralid moth feed upon the leaves of eggplant and *Solanum torvum*. The young larvæ live at first as miners in the leaves, but later web the leaves together. (See Pl. III, fig. 1.) The shelter is usually formed near the edge of the leaf, a portion of which is folded in toward the midvein and held in place by silken threads. Sometimes, however, parts of two or more leaves form the shelter. The larvæ feed from within these areas and are often common on both plants mentioned as hosts.

The moth has a wing expanse of three-fourths to seven-eighths of an inch and is gray in color. The wings are glistening and marked above with three darker, wavy, transverse lines, the two inner ones extending across both wings, while the outer one extends from the costal margin to a point near the middle of the front wing.

NACOLEIA INDICATA Fab.

The larva feeds upon the leaves of garden bean, webbing together parts of the same leaf or separate leaves. It also occurs on cowpea.

The adult, Plate II, figure 2, is golden yellow, the wings marked with black along the outer margin, and above with three black wavy lines extending across them, much as do the dark lines on the wings of *Pachyzancla periusalis*.

PILOCROCIS TRIPUNCTATA Fab.

Sweet-potato leaves have been found webbed together and injured by the larvæ.

The moth, shown in Plate III, figure 2, is light yellow, the wings being marked with black and brown, and having an expanse of about an inch.

PLUTELLA MACULIPENNIS Curtis.

Larvæ of the "diamond-back moth" are at times very abundant on and destructive to the leaves of cabbage. Mr. Barrett mentioned the species in his 1903 report (p. 448) and Mr. Tower, in his 1907 report (p. 35), listed cabbage, kale, mustard, and turnips as food plants, briefly summarized its life history, made note of a parasite, and mentioned remedies to be applied. A mustard leaf which has been severely injured by the larvæ is shown in Plate IV.

HYMENOPTERA.

SOLENOPSIS GEMINATA Fab.

The "fire ant," or "hormiga brava," has been found injuring okra plants by cutting away parts of the flowers and portions of the younger growth.

It is often stated in Porto Rico that ants destroy certain vegetable seeds after they have been planted in the soil. The writer has been told on good authority that ants, which from the description were apparently the "hormiga loca" or "crazy ant," *Prenolepis longicornis* Latr., were seen to dig small holes along the rows in a propagating box in which lettuce had been planted, remove the seeds, and carry them away.

DIPTERA.

Agromyza parvicornis Loew.

The "corn-leaf blotch miner," which has been recently made the subject of a paper [1] by Mr. W. J. Phillips, is present in Porto Rico, adults having been reared from larvæ found working in leaves of corn at Rio Piedras.

SUMMARY.

The following summary, arranged alphabetically according to host plants, indicates the insects known to attack the various vegetable crops grown in Porto Rico. The "changa" (*Scapteriscus didactylus* Latr.) is credited in this list as injuring only those plants which, according to Mr. Barrett, are most affected, though in reality the list of plants attacked by it is not so limited.

Beans:
- *Eutellix tenella* Baker. (?)
- *Eudamus proteus* L.
- *Empoasca mali* Le B.
- *Cerotoma denticornis* Oliv.
- *Nacoleia indicata* Fab.

Beets:
- *Pachyzancla bipunctalis* Fab.

Cabbage:
- *Scapteriscus didactylus* Latr.
- *Plutella maculipennis* Curtis.
- *Pieris monuste* L.

Celery:
- *Pseudococcus* sp. near *citri* Risso.

Corn:
- *Peregrinus maidis* Ashm.
- *Pseudococcus* sp. near. *citri* Risso.
- *Diabrotica graminea* Baly.
- *Laphygma frugiperda* S. & A.
- *Heliothis obsoleta* Fab.
- *Agromyza parvicornis* Loew.

Cucumber:
- *Aphis gossypii* Glov.
- *Diabrotica bivittata* Fab.

Cucumber—Continued.
- *Diabrotica innuba* Fab.
- *Diaphania hyalinata* L.

Eggplant:
- *Saissetia hemisphærica* Targ.
- *Hemichionaspis minor* Mask.
- *Corythaica monacha* Stål.
- *Scapteriscus didactylus* Latr.
- *Epitrix cucumeris* Harris (?).
- *Pachyzancla periusalis* Walk.

Horse-radish:
- *Pieris monuste* L.

Kale:
- *Pieris monuste* L.
- *Plutella maculipennis* Curtis.

Melon:
- *Aphis gossypii* Glov.
- *Diabrotica bivittata* Fab.
- *Diabrotica innuba* Fab.

Mustard:
- *Pieris monuste* L.
- *Plutella maculipennis* Curtis.

Okra:
- *Diaspis pentagona* Targ.
- *Diabrotica graminea* Baly.
- *Solenopsis geminata* Fab.

[1] Phillips, W. J. Corn-leaf blotch miner [*Agromyza parvicornis* Loew]. *In* U. S. Jour. Agr. Research, v. 2, no. 1, p. 15–31, 6 figs., 5. pl., Apr. 15, 1914.

Onion:
Thrips tabaci Lind.
Laphygma frugiperda S. & A.
Pepper:
Aleyrodes sp.
Diaspis pentagona Targ.
Radish:
Pieris monuste L.
Squash:
Diabrotica bivittata Fab.
Diabrotica innuba Fab.
Diaphania hyalinata L.
Sweet potato:
Spartocera batatas Fab.
Chætocnema apricaria Suffr.
Pilocrocis tripunctata Fab.
Cryptorhynchus batatæ Waterh.
Sweet potato—Continued.
Other insects, known as sweet-potato pests in the United States, are also present, namely—
Coptocycla signifera Herbst.
Cylas formicarius Oliv.
Phlegethontius convolvuli L.
Tomato:
Scapteriscus didactylus Latr.
Phlegethontius sexta Joh.
Aleyrodes sp.
Turnip:
Scapteriscus didactylus Latr.
Pieris monuste L.
Plutella maculipennis Curtis.
Yautia:
Corythuca gossypii Fab.

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